

IMPROVED APPARATUS AND METHOD OF OPERATION FOR BURNERS  
THAT USE FLUE GAS RECIRCULATION (FGR)

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ABSTRACT OF THE DISCLOSURE

10 The present invention is a method and apparatus to improve the utilization of  
flow and power characteristics of a combustion air fan over the full range of burner  
operation. More specifically, it is an apparatus and a method of operation that uses a  
high flue-gas-to-air ratio over most of the boiler operating range to maximize thermal  
efficiency, but which switches to a lower ratio of flue-gas-to-air, or no flue gas in the  
limiting case, at the high end of the mass flow range of the burner to minimize the size of  
the fan housing and fan motor. When applied to current generation ULNBs, fan size can  
be reduced about 50% and operating power consumption can be reduced by about 50%  
15 without adversely affecting NO<sub>x</sub> emissions.

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